9/3/69

Objectives

1. List the Basic Elements of Photography
   - Subject
   - Light
   - Light Light Box (Camera)
   - Light Sensitive Material (film)
   - Chemical Processing
2. List the Basic Elements of the Camera.
3. List the Steps in Emulsion Making (Light sensitive material or film)
4. Draw a cross section of Black & White film
5. List the steps in film processing

#2 - Camera Basic Elements

1. Shutter (can be opened & closed @ dif speeds ∴ controls amt of light in) covers opening — time open
2. Opening (apeture) diaphragm varies size of opening (as iris in eye)
3. Light tight
4. View finder
5. Lens
6. Film holder & Transport (i.e. spools etc.)

Film — The chemical NOT commonly used in making the emulsion (dispersion):
- K Bromide
- Gelatin
- Acetic Acid
- $AgNO_3$ silver nitrate

The light sensitive material is suspended in gelatin.

#4

protective over coat (plain gel) .0003" to .0001"

emulsion (gel + Ag x) .0003"

.003" to .005" Support (anything that will hold the light sensitive emulsion) can be:
(1) plastic
(2) paper
(3) glass
(4) metal
(5) cloth
(6) rubber

(put on because of rough emulsion you'd get physical exposure)

.0003" gelatin A.H. (anti halation) coating — a tint (blue, red, etc)

methylene chloride — acetone in it — solvent — in cellulose acetate — the support

(absorbs light keeps it from bouncing around, bottom have on back to gel on back makes as a drying wrap curl support)

Gelatin comes from just under hide (to eat) - 2nd fraction
" " " " " cow or pig " (for film) - pure fraction

Halogen — element — choices: Bromine, Iodine, ~~Fluorine~~

Very light sensitive (faster (more active) as go down scale)

?#3 $AgNO_3$ suspended in gelatin is Silver Chloride (when ∈ other element) — a halide

$$AgNO_3 + K\underset{(Cl)}{X} \longrightarrow \underset{\text{insoluble}}{Ag\underset{(Cl)}{X}}\downarrow + KNO_3$$

is removed

[illegible]

Wednesday Sept. 18?, 1969

paper & film are SUPPORTS!

developer – combination of hydroquinone. — MQ developer is metol+, not active fast enough alone

stop — acetic acid (dilute) 3%

fix — $Na_2S_2O_3$ (Sodium Thiosulfate) → ($NH_4S_2O_3$) ammonium for fast but not permanent

carcinogens – ~~for~~ color developing materials

film in developer for as long as suggested on cards ∈ film { type of film, different developer, temperature of solution

higher → ↑ development ∴ ↓ time

CAROSEL 950 RA. (∈ random access) } Projector

latent image – before developed (immediately after developed
developed image

red, green, blue } 1/3 ∴ dark on positive
yellow } – 2/3 light ∴ light on positive

FOR GOOD PICTURE TAKING:

watch parts of body close to you
watch crooked pix on wall
tissue on cube when close
be sure to be @ an angle so don't get reflection
don't move camera
parallax the closer you get to subject (less of left & more of rt.)

2 more weeks of photography

9/25/69

sharpen picture up in projector when it looks like its going out of focus

300 watts LOW
500 watts HIGH } Intensity on Ectrographic Projector

REVERSAL PROCESS (DIRECT POSITIVE PROCESS)

exposed film & then bleached it

latent image (exposed)
developer
stop (neutralizes developer
fix (dissolves unexposed Ag X)
wash

NEGATIVE here

here put in a bleach (attacks only the black Ag X)

wash

RE-EXPOSE this

develop 2nd time ← POSITIVE

stop
fix
wash

basis for color process!

end = a black & white slide if using black & white film

subtractive colors

cyan = blue + green (white − red)
magenta = red + blue (" − green)
yellow = green + red (" − blue)

subtractive system vs additive " ~~[illegible]~~

(cross section)
SUBJECT (color film)

	RED	GREEN	BLUE	WHITE	GRAY	BLACK	~~MAGENTA~~ yellow/magenta	~~ORANGE~~ cyan
all Ag X sensitive to blue ① Layer								
CARREY-LEA FILTER (yellow) Layer								
green ③ Layer								
red ④ Layer								

this goes ← it es silver when it is washed away

(a colloidal silver) (coat ←)

Ektachrome-X

(Kodachrome-X same right like except has dies right in the layer (in Kodachrome it's put in in tanks).

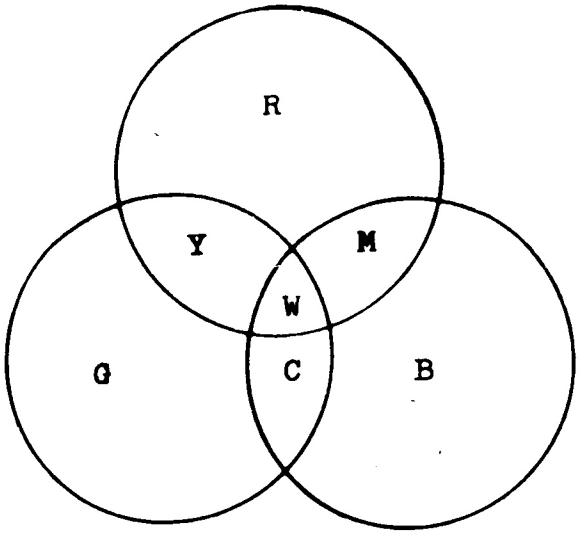
protective overcoat								
Blue sensitive Ag X + ①	gives	yellow						
carrey-lea filter (yellow) ②								
~~Green sensitive~~ Ag X → ~~Blue dens~~ + ③	gives magenta							
~~Red~~ " " → ~~Blue dens~~ + ④	gives cyan							
Antihalation layer ⑤								
Support base ⑥		Support						base
Anti static layer ⑦ (ZELEC — A DuPont Product)								

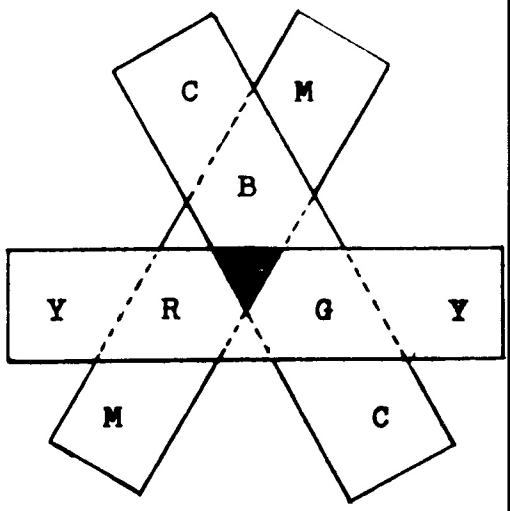
STEPS
1 exposed
2 2nd any colors
3 out silver

Blue 1	yellow	yellow	~~exposed~~	~~exposed~~	~~½ yellow ½ exposed~~	yellow	~~yellow exposed~~	~~exposed~~ ~~exposed~~
carrey lea 2								
Green 3	magenta	~~exposed~~	magenta	~~exposed~~	~~½ magenta ½ exposed~~	~~magenta exposed~~	~~exposed~~ ~~magenta~~	~~exposed~~
Red 4	~~exposed~~	cyan	cyan	~~exposed~~	~~½ cyan ½ exposed~~	~~cyan~~	~~exposed~~ cyan	~~exposed~~ cyan
Antihalation 5								
Support 6								
anti static 7								

SUBJECT _____

	RED	GREEN	BLUE	WHITE	GRAY	BLACK	MAGENTA	ORANGE
Layer →								
_____ Layer →								
Layer →								
Layer →								
_____								
_____								





1. Specify the following colors in the Additive System of Color Mixing.

   a. White = red + green + blue

   b. Medium Gray = ½ of red, green, blue

   c. Magenta = ~~white - green~~ red + blue

   d. Dark Yellow = more green than red

   e. Orange = more red than green

   f. Chartreuse =

   g. Brown =

2. Specify the following colors in the Subtractive System of Color Mixing.

   a. Black =

   b. Medium Gray = white minus ½ all 3

   c. Red = white minus ~~red~~ green & blue (cyan)

   d. Yellow = white − blue

   e. Orange =

   f. Dark Brown =

   g. Pastel Blue =

in "chrome" films (as Ectachrome)

sensitive to	red	green	blue	white	gray	black	magenta	orange
blue								
yellow filter								
green								
red								

all silver halide is sensitive to blue ∴ if don't do anything all 3 would be exposed unless

carrey-lea (yellow) is

~~[illegible]~~ negative image from 1st developing
~~[illegible]~~ positive " " 2nd (color) " (red) ← also chemical reaction & in bottom layer a cyan die is formed around each exposed particle (the exhausted developer (oxidized) is coupler & forms die)

(green) the 3rd to magenta

(blue) the top to yellow

then out silver from negative & " positive
but leave 3 subtractive layers
& yields color pix.

~~Date~~
~~Assignment~~
~~Name~~

10/1/69

Antihalation
many colors (of layers)

sharper pix = more detail = antihalation layer

The { blue, green, red } sensitive layer gives { yellow, magenta, cyan } respectively WHEN YOU WANT IT TO!

plus a colorless dye forming coupler (dfc) which

Since 1st get negative DON'T want yellow to form

This is put together @ about 100°

1. (solution) Hardener (hardens by chemical crosslinking)
2. neutralizer (neutralizes hardener)
3. (black & white negative) 1st developer (MQ or methylhydroquinone) changes AgX (exposed) to black Ag (NEGATIVE MADE)
4. STOP bath (acid neutralizes developer) & agent to minimize swelling of gel)
5. (black & white positive) Color developer (1) (chemically exposes all that's left) (fogs it)
   (2) & begins to develop that fogged Ag (oxidized developer) reacts
   (3) oxidized developer + cfc (of each layer) → yellow, magenta, cyan
   (color positive) (around) Ag° particle
   ! combined
6. stop bath (acid neutralizes developer)
7. BLEACH (K Fe Br) (to get black Ag° out) (it converts Ag° to AgX (chloride) (not soluble & is light sensitive))
8. fix (hypo) (to take out AgX by making it soluble)

PRESTO!

10/1/69

when add additive primary & its complimentary color = white

~~Mir~~
~~Cher~~
~~Wand~~
~~Claire~~

Mary Ann
Jo
Marlene
Cheri
Sandy

overcast skys - color may be reflected

10/8/69

Worth How Many Worlds (excellent!!

there are extension cords for the carosel from projector to the wire infuse of clicks slides

KODACOLOR: ① Blue sensitive AgX + dye forming coupler (colorless) = yellow

② Carey Lea Filter — (yellow Ag°)

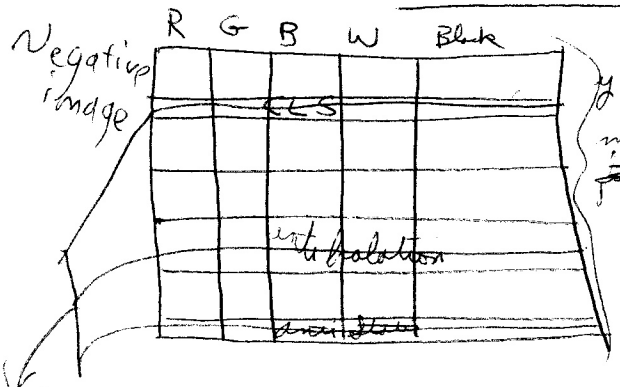
③ Green sens AgX + dfc (yellow colored) = (y = R+G) → magenta

④ Red sens AgX + dfc (yellow colored) = cyan (red = a lack of everything)

⑤ Antihalation layer Ag° (greyish)

⑥ / / ~~Support~~ / /

Anti ~~static~~ layer Ag° (Dupont Zelec)



y + Ag° + colorless (+ unexposed AgX) background

m + Ag° + unexposed AgX + yellow background

c + Ag° + unexposed AgX + reddish background

color development

c all out bleach & fix

① Color dev (a) AgX → Ag° ∴ is negative image

(b) developer oxidized

(c) oxidized developer + dfc gave → 1 yellow
→ 2 magenta
→ 3 cyan

helps control quality of light in making print

② stop bath

③ Harden gelatin

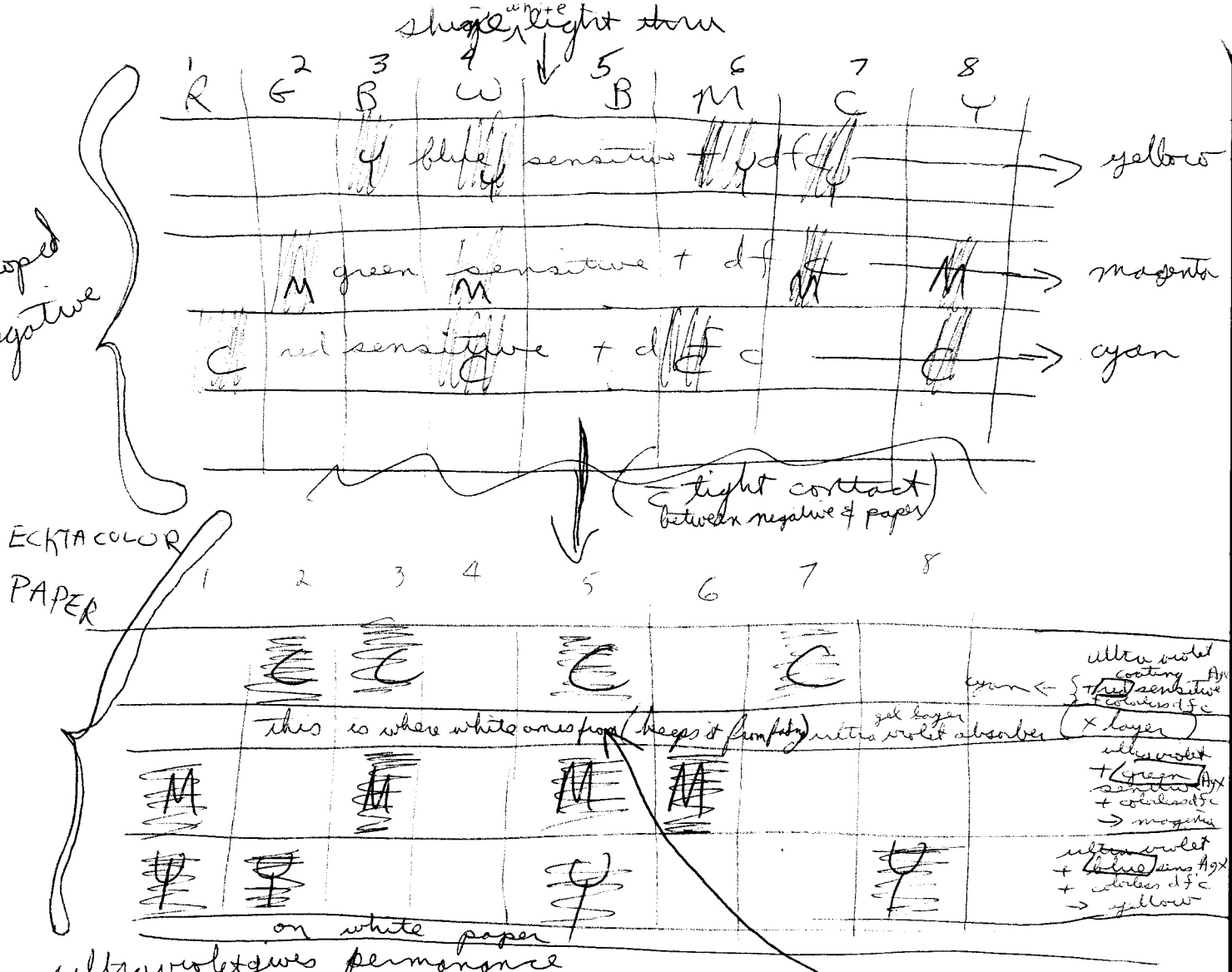
④ wash

⑤ bleach (ferrous cyanide bromide) makes Ag° → AgBr (not ness light sensitive) & is insoluble

⑥ fix (Hypo) converts AgX to soluble form & washes out

⑦

so here have y + m + c image superimposed as self c orange background



ultraviolet gives permanence
ultraviolet on left side of spectrum

Paper coating — a barita coating (barium sulfate) in gelatin
white powder (in barium enema)

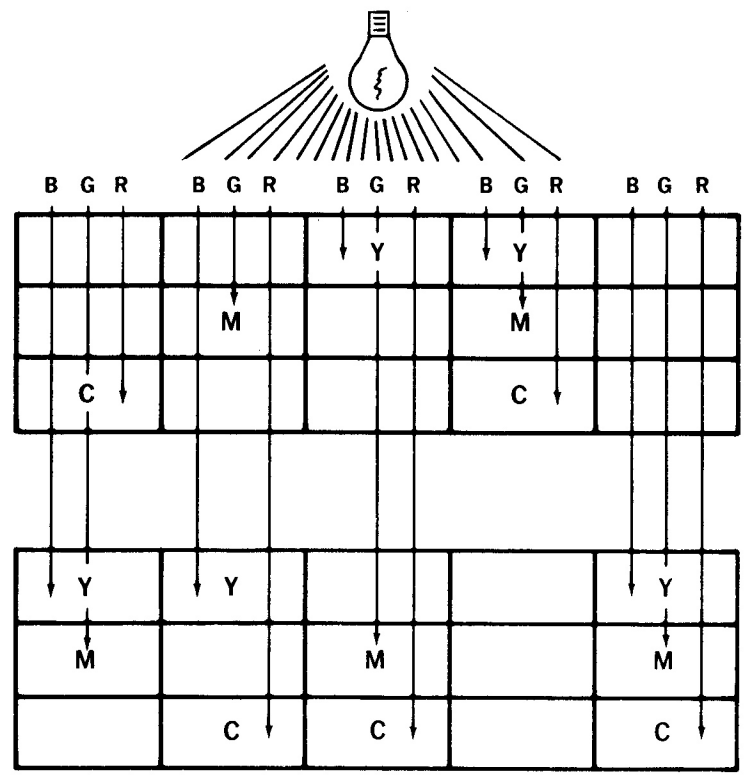
① color developer (as for negative development)
a) $AgX \rightarrow Ag^{\circ}$ (→ image)
b) Dev → oxidized
c) Oxdev + dfc → 1) yellow, 2) magenta, 3) cyan } positives

② Stop bath
③ Hardener
④ Wash
⑤ Bleach ($Ag^{\circ} \rightarrow AgBr$)
⑥ Hypo (Fix)
⑦ Wash

magenta contributes 60% to image quality
cyan 30%
yellow 10%

SUBJECT COLORS	RED	GREEN	BLUE	WHITE	BLACK
KODACOLOR NEGATIVE — BL SENSITIVE			Y	Y	
KODACOLOR NEGATIVE — GR SENSITIVE		M		M	
KODACOLOR NEGATIVE — R SENSITIVE	C			C	

PRINTER LIGHT SOURCE
(White Light = B + G + R)



Ektagraphic visual maker (stick #304 in & it takes 1½ pictures
" " " " " " ½ " " "
has a shallow depth of field

Four Keys to Color

ASA 25
ASA 64
1. Kodachrome II
2. Kodachrome X
3. High Speed Ectachrome
4. Ectachrome X

not as dif now

1. good all round color film
good flesh tones
handles contrast well

2. lets you shoot early & late in day
for somber colors
more contrast than KII
use fill in flash bulb

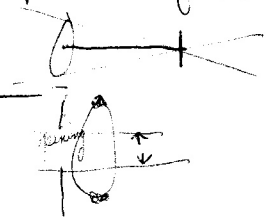
use music when show introductory label

3. extremely fast & can process yourself
grainier, not as sharp as KII
use inside & out flash
@ night (& little light) & is film c indoor light

4. bold brilliant (bold colors)
can use smaller opening
fine grain,

ASA 64 for slides
ASA 80 for pictures } good

circles of confusion
where pic begins to be fuzzy



f stop is = focal length / effective diameter of lens

for good sharp pictures & out rainbow
DON'T USE 22 or 16

begin to run ~~4 or lower~~
into trouble @ f4 or lower

Come to the Adirondacks — in north tip of N.Y. State

PROPERTIES

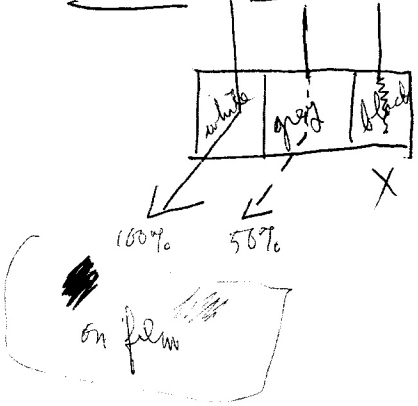
Gelatin(s) — swells (NOT soluble)
permeable
flexable
a dispersing agen
has no photographic effect on Ag x

can also control speed ⊂ particle size
the [redacted] bigger particle → the faster (more light sensitive)

(Sulfur in the mustard plant → sensitized gelatin) (used to depend on) NOW STRIP gelatin of all impurities & add sensitizing agents they wish.

THE NEGATIVE - POSITIVE PROCESS

ORIGINAL SUBJECT



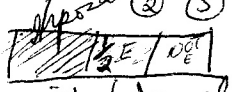
TO

latent image on film after take pic.

gelatin stays there — it's just the chemicals that come out.

want only exposed area to go black & ∴ develop in dark.
fix ⊂ fixing solution (so unexposed area won't go black)

#5 Film Processing Steps
(can't be done in light)
(can't be bumpy)



on film

(1) put into developing solution (developer) (DEKTOL) which changes exposed Ag x → Ag (black)

also have unexposed Ag x ← still sensitive

if over develop get blurry because unexp. area gets black slowly by injectious devel. → developer in alkaline solution

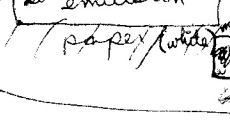
(2) stop bath has acetic acid (3%) to neutralize developer

WASH AFTER FIX

(3) fix (hypo) 5-10 min → dissolves the unexposed & undeveloped Ag x converts Ag x into soluble form

TO

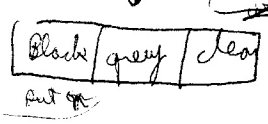
& ⊂ wash takes it out in standing water



& shine light thru negative

TO

exposed paper



NEGATIVE